LOCATING YOUR PULSE

The pulse can be used to determine heart rate. The two locations to determine pulse rate employed most often are the wrist (radial pulse) and the neck (carotid pulse).

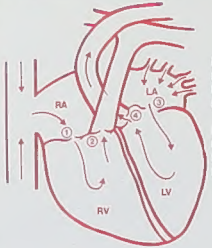
RADIAL PULSE RATE

Place the middle three fingers of one hand along the edge of the wrist just below the base of the thumb. Locate the radial pulse.

CAROTID PULSE RATE

Placing the thumb on the chin, put the middle three fingers of one hand along the back edge of the pharynx (Adam's Apple) and locate the carotid pulse at the side of the neck. Press only hard enough to feel the pulse. Do not be overly vigorous in pressing. In addition, it is important that only one side of the neck be palpated to avoid any potential problems from simultaneous bilateral palpation.

THE HEART



RA Right Atrium
(1) Tricuspid Valve
RV Right Ventricle
(2) Pulmonary Valve

LA Left Atrium
(3) Aortic Valve
LV Left Ventricle
(4) Mitral Valve

ELECTROCARDIOGRAM (E.C.G.)

The E.C.G. is a recording of the electrical changes stimulated within the heart's different chambers. This tracing or waveform is represented graphically above and labelled according to current practice. The E.C.G. assists clinicians in determining the operating efficiency of the heart. In the normal heart beat each component of the waveform is present.

P wave:	Atrial contraction
QRS segment:	Ventricular activation
T wave:	Ventricular recovery

TERMINOLOGY

PULSE

- A wave of arterial expansion spreading outwards along the arteries at each beat of the heart.

RESTING PULSE RATE

- The number of times the heart beats per minute while the individual is at rest, usually in a lying position.

BRADYCARDIA

- Slow heart beat.

TACHYCARDIA

- Rapid heart beat.

TARGET HEART RATE

- Age-adjusted heart rate zone to assist individuals to determine a safe intensity level for personal exercise activities.

MAXIMUM HEART RATE

- Highest attainable heart rate, indicative of the individual's maximal work capacity.

ARRHYTHMIA

- Irregular heart beat.

AEROBIC FITNESS

- Cardio-respiratory efficiency of the individual as expressed by the ability of the body to take in and utilize oxygen.

ELECTRO-CARDIOGRAM

- A record of heart action describing the spread of excitation to the different chambers of the heart.

HEART SOUNDS

- Characterized LUBB, DUPP. The first sound (LUBB) results from contraction of the ventricle, tension of the atrio-ventricular valves. Following a brief pause, the second sound (DUPP) represents the closure of the aortic and pulmonary valves.

SYSTOLE

- Contraction of the heart chambers.

DIASTOLE

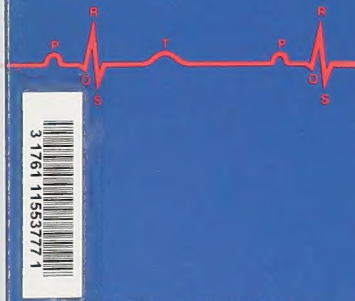
- Relaxation with accompanying dilation.

CARDIAC OUTPUT

- Amount of blood pumped out per minute. Determined by the heart rate and the stroke volume (i.e.) the amount pumped out with each beat.

Prepared by the Fitness section of the Fitness and Amateur Sport Branch for the Employee Fitness and Lifestyle Project at The Canada Life Assurance Company, 1978, operated by the Y.M.C.A. of Metropolitan Toronto and sponsored by Fitness and Amateur Sport.

YOU AND YOUR HEART RATE



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INTRODUCTION

The human heart is a four-chambered muscular organ the size of a clenched fist and weighs approximately 350 gm. The amount of physical work it accomplishes is absolutely astounding. Consider for a moment the following feats:

- It beats continuously on the average 70 times per minute with only one half-second of rest between beats.
- About 70 ml of blood is expelled from the heart with each beat at a pressure of 120 mm of mercury.
- During exercise the heart can increase its output six-fold to 30 litres of blood per ventricle per minute or about a bathful of blood (i.e. 26 gallons) every two minutes.
- In a lifetime, the heart beats over 2,500,000,000 times expelling about 170,000,000 litres of blood. Moreover, actual work done by the heart could raise 250 kg of blood to a height of almost 1931 km!

The resting heart rate has a normal range of 50 to 100 beats/minute, with the average resting rate being 70 beats/minute for males, and 75 beats/minute for females. Variations in the resting rate could be a result of heredity, anxiety, fitness status, and disease among other reasons.

Recent study results have implicated resting heart rate as a potential independent risk factor in cardiovascular disease:

"Resting heart rates of 80 and greater were associated with sizeable increases in risk of dying over the next ten years from all causes, all cardiovascular-renal diseases, coronary heart disease and sudden death."
Ref. Stamler *et al*, Peoples Gas Company Study

It has been observed that the majority of individuals with high resting rates are either smokers, coffee drinkers, overweight, out of shape, or are exposed to constant anxiety situations.

FACTORS AFFECTING HEART RATE

AGE

Although the maximum heart rate decreases with advancing age, resting heart rate remains relatively stable.

SEX

Males generally have a lower heart rate than females. This is due to the reduced oxygen-carrying capacity of the female's circulatory system.

FITNESS STATUS

The higher the fitness status, the lower the resting heart rate. The well-conditioned athlete may have a resting heart rate of less than 50 beats/minute.

FEVER

Heart rate increases approximately 20 beats/minute for every rise of 1°C above normal in body temperature.

SLEEP

There is a progressive fall in heart rate during sleep.

TOBACCO

Nicoline in small amounts causes an increase in heart rate. Smokers have higher average heart rates than non-smokers primarily because of the effects of carbon monoxide within the tobacco smoke.

COFFEE

Caffein stimulates heart rate. Tea, cocoa and cola drinks also contain caffein.

AMBIENT TEMPERATURE

Increases in heat and/or humidity will cause an increase in normal or resting heart rate. Decreases in temperature alternatively will result in a lower heart rate.

HEART RATE AND EXERCISE

Heart rate is the best way available at the present time to control exercise intensity. Although relatively unsophisticated, it is very accurate in providing basic physiological information about human performance.

A prominent exercise physiologist has noted that by expending some 2000 extra heart beats during a day's exercise session, one can save 10,000 to 30,000 beats over the remainder of the day. Furthermore, a one-beat saving in the resting or average heart rate translates into 1440 beats/day, or 525,600 beats/year.

Heart rate possesses a built-in adaptation to training. As an individual becomes better conditioned, the heart rate for the same amount of work decreases. Thus, once a training or target heart rate has been established, a little bit more work would be required each day to achieve the target rate. Moreover, the heart rate control of exercise intensity has the advantage of accounting for any changes that might occur in the environment (i.e. heat, cold, altitude) or with the individual (i.e. illness, weight gain).

Different exercises elicit different heart rate responses. Rhythmical and dynamic muscular activity (e.g. running, swimming, dancing) stimulates significant increases in heart rate. Static, straining types of exercises (e.g. weight lifting, isometrics) stimulate only slight increases in heart rate.

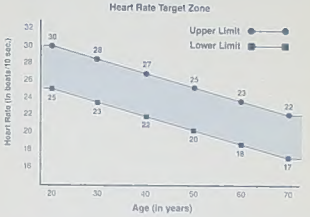
Heart rate may also increase significantly as a result of the following exercise-related factors:

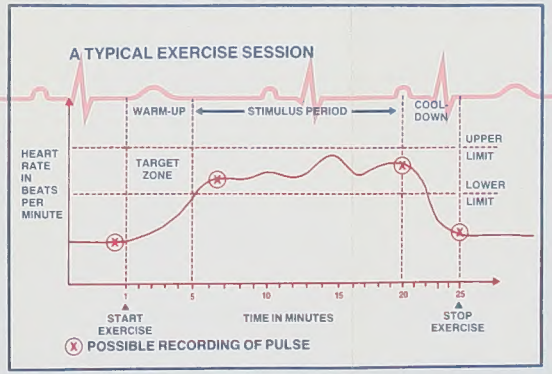
(1) Intensity. The more intensive the activity the greater the increase. Heart rate monitoring can be used to control exercise intensity.

(2) Duration of exercise. A secondary increase in heart rate for a given moderate workload can be expected the longer one exercises due to fatigue of skeletal musculature.

TARGET HEART RATE FOR AEROBIC EXERCISE

To determine if you are exercising at the correct intensity stop your activity momentarily, take your pulse for 10 seconds. Check the chart and see if your pulse rate falls within the target zone. In the beginning keep your pulse rate near the lower limit. As you become fitter, your target heart rate can approach the upper limit. It is important to begin taking your pulse rate within 5 seconds of stopping the exercise since the heart rate will decrease significantly after 15 seconds.





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